INVENTION –

IN THE CLAIMS

Please cancel claims 37, 38, 40, 47 and 48.

Please amend the claims as appended hereto in both clean and marked-up versions.

REMARKS

Claims 29-36, 39, 41-46 and 49-51 are pending.

Applicants enclose a supplemental Form PTO1449 listing the "Other Documents" in compliance with 37 CFR §1.98.

Applicants believe the title of the invention is descriptive. If the Examiner maintains any further objection to the title and abstract, applicants request a suggestion for alternate language.

No correction of the term "trebled" to "tripled" is necessary. These two words mean the same thing. See. e.g., *Webster's Ninth New Collegiate Dictionary* (1986).

Claims 37-40 and 45 stand rejected under 35 U.S.C. §101. Applicants have amended or canceled these claims, thereby overcoming this rejection.

Claims 29-46 stand rejected under 35 U.S.C. §112, first paragraph. Applicants respectfully traverse this rejection.

First, it should be emphasized that the instant invention provides a completely novel way for producing herbicide-resistant or -tolerant plants. The advantage is that, in contrast to previously known methods, no detailed knowledge of either the molecular mechanism of herbicidal action in the plant or of plant enzymes and their encoding

genes of essential biosynthetic pathways involved in imparting herbicide resistance is required. The emphasis in the present invention lies upon the expression of an "exogenous" polypeptide, antibody, or part of an antibody. Thereby "exogenous" in the sense of the present invention means, that the antibody does *not* act via any kind of *endogenous* component, like an enzyme or gene of an essential biosynthetic pathway or via endogenous components involved in gene expression or enzyme activity or other endogenous metabolites of a plant or microorganism, but solely via a *non-endogenous*, i.e. via an exogenous antigen, here preferably the chemically synthesized herbicide. This is a great advantage of the instant invention, because no detailed knowledge about endogenous mechanisms, genes, enzymes etc. are necessary. The present invention is absolutely independent from this biochemical or genetic information. Only the availability of the herbicide as a chemical compound itself is sufficient to produce a herbicide-tolerant or -resistant transgenic plant. The disclosure of this context is given on page 4, line 33 to page 5, line 11 of the instant specification.

Further, the method for producing the specific antibody against an exogenous antigen and the steps how to clone the relevant gene coding for this exogenous antibody are disclosed in detail in the specification at page 5, line 17 ff. Here the herbicide is used to immunize a vertebrate which itself produces an antibody against this herbicide. The antiserum is isolated from the immunized vertebrate and used to produce a specific monoclonal antibody following art known techniques of hybridoma cell cultures. The mRNA encoding the herbicide specific monoclonal antibody is isolated from the hybridoma cells and subsequently the cDNA encoding the monoclonal

antibody or a part of the monoclonal antibody is prepared, e.g. via PCR. Then the cDNA is cloned into an expression cassette or a phage display library to test the functional expression in prokaryotic or eukaryotic organisms, e.g. in plants. After transformation of the of the cDNA (in a suitable expression cassette) into the plant, a polypeptide with specific antigenic function is expressed which binds to the fungicide molecules applied to the plant and converts the fungicide into a complex which has non-fungicidal properties. Thus, the instant application provides a person skilled in the art with the exact information for producing a fungicide-resistant or -tolerant plant.

Another advantage of the instant invention is, that during PCR with the isolated cDNA prepared fro the monoclonal antibody producing hybridoma cells described above, only the variable single chain fragments (scFv) of the antibody can be amplified (as discussed further below).

The primers suitable for amplification of the scFv of an antibody via PCR are known to one skilled in the art, since every nucleotide sequence encoding a variable single chain fragment of an antibody contains, in addition to the specific antigen determinate, some conserved regions. Therefore, it should not be necessary to state the primer sequences explicitly.

The advantages of the variable single chain fragment (scFv) of an antibody of the present invention over a whole antibody are as follows: the scFv is the reaction specific part o the antibody involved in the antigen-antibody-interaction and what was shown in the present invention is that the present scFv is sufficient to "inactivate" the herbicide through binding the herbicide and converting it into a non-functional complex;

the present scFv is easier to handle than the whole antibody, e.g. concerning the expression and assembly in the plant cell (the whole antibody with its light and heavy chains would not assemble in the plant cell (the whole antibody with its light and heavy chains would not assemble in the plant cytoplasm); further it is not necessary to construct and breed two different plant cell lines in time consuming procedures each encoding for the light and heavy chains of an antibody , respectively. Moreover, the expression of scFv in the plant cell and the scFv itself is more stable than the complete antibody. Therefore, the plants encoding the present herbicide-specific scFv also show specific tolerance or resistance against a special kind of herbicide and are more stable than plants expressing the whole antibody. Finally, the plant specificity against a defined herbicide is of immense importance for agricultural use of plants provided by the instant invention.

In summary, the present application discloses a novel route and working guide for the general production of any kind of herbicide-tolerant or -resistant plants without the knowledge of biochemical or genetic mechanisms of action of the herbicide. Through the novel method of expressing an *exogenous* antibody or part thereof in plants, the present invention delivers a quick and advantageous *method* for producing specific herbicide-tolerant or -resistant plants. No such method was known at the time of the present invention. The scFv encoding nucleotide sequence itself and its disclosure is of minor importance to the underlying novel and inventive method.

Claims 29-46 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner's many suggestions are appreciated. Applicants have

amended the claims on most of the points noted by the examiner.

A definition of "exogenous" is given implicitly in the description of the instant invention on page 4, line 33, to page 5, line 11. The known methods require knowledge of the mechanisms of action of the herbicide in the plant, i.e. endogenously. In contrast, the present invention provides a novel method independent from the knowledge of endogenous mechanisms in the plant. Here, a gene encoding an exogenous antibody or a part thereof is expressed in plants. In other words, the antibody is produced by immunizing vertebrates with the herbicide, followed by the isolation of the gene encoding the exogenous antibody out of hybridoma cells and the transformation of the gene into plants. The expressed antibody interacts specifically with its antigen which is the herbicide. "Exogenous", in the sense of the present invention, means that the antibody *does not interact with any kind of component naturally existing in the plant*, i.e. endogenous components of biochemical pathways or genetic elements involved in herbicide resistance mechanism.

A definition of "tolerance in the sense of the invention is given on page 13, line 22.

A check for $390 to cover the two-month extension fee is enclosed.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11.0345. Please credit any excess fees to such deposit account.

Respectfully submitted,
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Claims as amended, clean version

29. A process for the production of a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-tolerant plant, said process comprising transforming a plant with a gene encoding an exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide.

30. A process as claimed in claim 29, wherein the exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide is a single-chain antibody fragment.

SUB C3

31. A process as claimed in claim 29, wherein the exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide is a complete antibody or a fragment of a complete antibody.

B1

32. An expression cassette for plants, comprising a promoter, a signal peptide, a gene encoding an exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide (or a part thereof), an ER retention signal and a terminator.

33. An expression cassette as claimed in claim 32, wherein the promoter is constitutive.

34. An expression cassette as claimed in claim 32, wherein the gene encodes a single-chain antibody fragment.

35. An expression cassette as claimed in claim 32, wherein the gene encodes a fusion protein comprising a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide (or a part thereof) and at least one other functional protein (or a part thereof) selected from the group consisting of enzymes, toxins, chromophores and binding proteins.

36. An expression cassette as claimed in claim 32, wherein the gene is isolated from a hybridoma cell or with the aid of other recombinant methods.

B2 SUB C4

39. A selection marker comprising the expression cassette as claimed in claim 32.

B3 SUB C5

41. A process for the transformation of a plant or cells of a plant, said process comprising introducing a gene sequence which encodes a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide into the

SUB C5 cont

plant or the cells of the plant.

42. A process as claimed in claim 41, wherein transformation is effected with the aid of an *Agrobacterium*.

SUB C6

43. A process as claimed in claim 41, wherein transformation is effected with the aid of electroporation.

44. A process as claimed in claim 41, wherein transformation is effected with the aid of the particle bombardment method.

B3

SUB C7

45. A process for production of a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide, said process comprising transforming a plant or cells of a plant with a gene which encodes such a polypeptide and subsequently isolating the polypeptide.

SUB C8

46. A plant comprising the expression cassette as claimed in claim 33, wherein the expression cassette imparts improved tolerance to the plant against methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F).

49. A process as claimed in claim 41, wherein the gene sequence which encodes a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide is part of an expression cassette which also comprises a signal peptide, an ER retention signal and a terminator.

SUB C9

B4

50. A process as claimed in claim 42, wherein the *Agrobacterium* is of the species *Agrobacterium tumefaciens*.

51. An expression cassette as claimed in claim 33, wherein the constitutive promoter is the CaMV 35S promoter.

Claims as amended, marked-up version

29. (amended) A process for the production of a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-tolerant plant [by expressing]. said process comprising transforming a plant with a gene encoding an exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide [in the plant].

31. (amended) A process as claimed in claim 29, wherein the exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide is a complete antibody or a fragment [derived therefrom] of a complete antibody.

32. (amended) An expression cassette for plants, [composed of] comprising a promoter, a signal peptide, a gene encoding [expression of] an exogenous methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide (or a part thereof), an ER retention signal and a terminator.

33. (amended) An expression cassette as claimed in claim 32, wherein the [constitutive] promoter [used is the CaMV 35S promotor] is constitutive.

34. (amended) An expression cassette as claimed in claim 32, wherein the gene [to be expressed is the gene of] encodes a single-chain antibody fragment.

35. (amended) An expression cassette as claimed in claim 32, wherein the gene [or gene fragment of] encodes a fusion protein comprising a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide (or a part thereof) [in the form of a translation fusion with other functional proteins, for example] and at least one other functional protein (or a part thereof) selected from the group consisting of enzymes, toxins, chromophores and binding proteins [, is employed as the gene to be expressed].

36. (amended) An expression cassette as claimed in claim 32, wherein the [polypeptide] gene [to be expressed is obtained] is isolated from a hybridoma cell or with the aid of other recombinant methods [, for example the antibody phage display method].

39. (amended) [The use of the expression cassette as claimed in claim 32, as] A selection marker comprising the expression cassette as claimed in claim 32.

41. (amended) A process for the transformation of a plant [by] or cells of a plant, said process comprising introducing a gene sequence which encodes a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide into [a plant cell, into callus tissue, an entire plant and protoplasts of plant cells] the plant or the cells of the plant.

42. (amended) A process as claimed in claim 41, wherein transformation is effected with the aid of an [agrobacterium, in particular of the species Agrobacterium tumefaciens] *Agrobacterium*.

45. (amended) [The] A process for production of a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide [by expressing], said process comprising transforming a plant or cells of a plant with a gene which encodes such a polypeptide [in a plant or cells of a plant] and subsequently isolating the polypeptide.

46. (amended) A plant comprising [an] the expression cassette as claimed in claim 33, wherein the expression cassette imparts improved tolerance to the plant against methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F).

49. (new) A process as claimed in claim 41, wherein the gene sequence which encodes a methyl methoxyimino-α-(o-tolyloxy)-o-tolylacetate (BAS 490F)-binding polypeptide is part of an expression cassette which also comprises a signal peptide, an ER retention signal and a terminator.

50. (new) A process as claimed in claim 42, wherein the *Agrobacterium* is of the species *Agrobacterium tumefaciens*.

51. (new) An expression cassette as claimed in claim 33, wherein the constitutive promoter is the CaMV 35S promoter.